Stewart Old Gym Building

Seismic Stabilization and Rehabilitation

SPWD Project 23-P09

Programming and Conceptual Design Document

September 30, 2024

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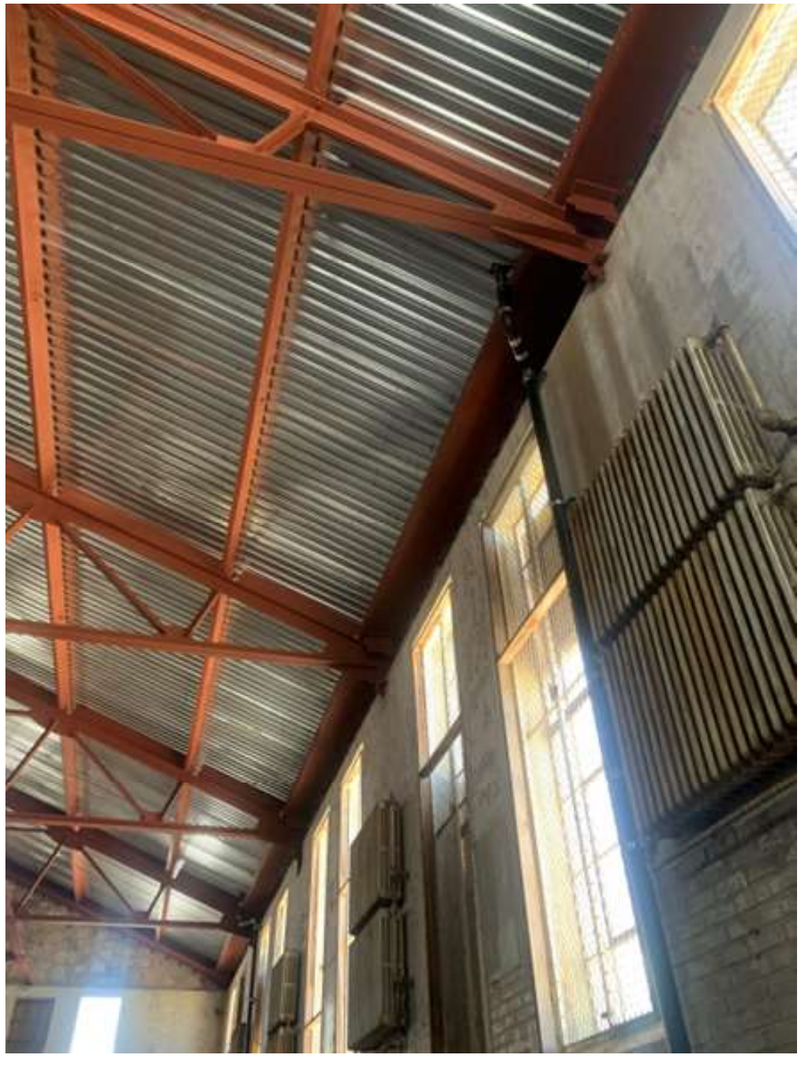
Project Background

The Old Gymnasium (Stewart Facility Building 20) was constructed in 1938 and remained in use until 1980 when the school was closed. The building fell into disrepair with broken windows and a failed roof. As a result of the roof failure, the interior of the building was flooded destroying the wood parquet floor and the bleachers in the gymnasium and most of the plaster ceilings in the locker room and office spaces

In 2017 the State of Nevada undertook a roof replacement and seismic stabilization project to stop the damage to the building and stabilize the roof structure in compliance with current codes. The interior of the building was cleaned with the damaged material removed (including the bleachers), and a new roof was installed.

Project Background

After the roof replacement, the building was secured awaiting additional renovations.



Scope of Work

The current project scope is to provide advanced planning and design to complete the seismic stabilization and rehabilitation of the building. A structural analysis is currently underway to identify the seismic stabilization requirements. It is anticipated that additional steel framing will be added on the interior of the building to support the unreinforced stone walls.

The next step in the process is to discuss and determine the preferred outcome of the rehabilitation to provide the best and most desirable use for the building.

The description of the project from the legislative approval is as follows:

> *"The Stewart Indian School Master Plan designates Building #20 as a flexible meeting space for conferences, community events and gatherings. This use would provide a potential revenue stream for the sustainability of the Stewart Indian School Living Legacy initiative underway at the Stewart Indian School. The Old Gym is the heart of the campus and has been identified by the Stewart Master Plan Team as an integral part of telling the story of the Stewart Indian School athletic program."*

The State and Design Team sought input on potential and preferred uses for the building.

The following questions were posed to the Steering Committee and alumni at the Father's Day Powwow:

Things to consider:

- What do you want the building to be used for?
- What activities should the building support?
- What rooms or functions should be included in the building?
- Who will be using the building.

There are also questions about the reconstruction of elements that were removed.

- Do you want the bleachers reconstructed (even if they are not accessible)?
- Any other features you would like to see replaced or retained? Items such as the wood floor or ceramic tile?

Building Program

The feedback received indicated a strong preference to have the main portion of the facility, referred to as the gymnasium, be rehabilitated to a condition similar to its original appearance. Suggested uses for the gymnasium include:

- Alumni Conferences and meetings
- Community events such as Craft Fairs or fundraisers
- Ceremonies, such as dances or weddings
- Athletics - basketball, volleyball, gymnastics
- Cultural activities such as movies or art shows
- Student activity center and summer camp

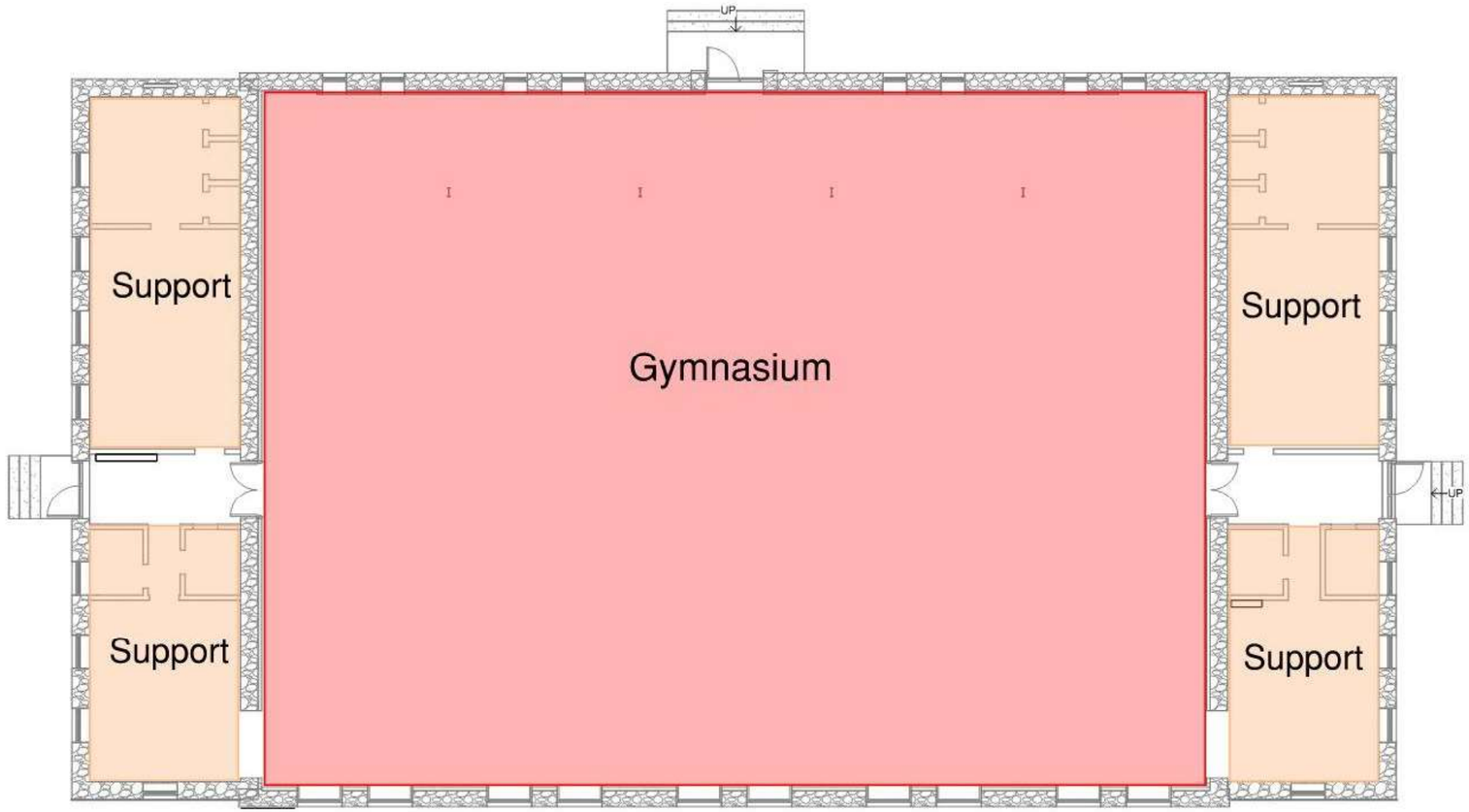
The original bleachers in the gymnasium were elevated above the north, east and west sides of the space accessed from stairs in the northeast and northwest corners of the space. As part of the rehabilitation of the gymnasium, most respondents requested that the bleachers be reconstructed.

Requests for the portions of the building to the east and west of the gymnasium were more varied but generally included spaces to support activities in the gymnasium. Those spaces include:

- Kitchen (sink, refrigerator, counter space)
- Storage for chairs and tables
- Dressing rooms and shower facilities
- Restrooms

There were also several comments in favor of including displays and memorabilia from the Stewart athletic program. These displays could be included within the gymnasium or as a dedicated space in the support areas.

The existing building entrances will be maintained so it is anticipated that the circulation areas through the support spaces will be maintained.



Design Concept Floor Plan

Secretary of Interior Standards and Stewart Covenants

The Secretary of the Interior's Standards for Rehabilitation assist in the preservation of the property and provide guidelines for appropriate treatment recommendations for the historic buildings on the Stewart Indian School campus. The covenants held by the Nevada State Historic Preservation Office state in Condition 1 that rehabilitation of the Stewart campus will be done in accordance with the Secretary of the Interior's Standards for Rehabilitation. Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving these portions or features which convey its historical, cultural, and architectural values. Rehabilitation encourages the retention of surviving historic material and features, but also accommodates modifications that enable buildings to be adapted for new functions that will allow them to remain viable.

Rehabilitation within the context of the Secretary of the Interior's Standards for Rehabilitation calls for the preservation of exterior and interior portions or features of the building that are significant to its historic, architectural and cultural values. Interior components worthy of preservation may include the building's plan (sequence of spaces and circulation patterns), the building's spaces (rooms and volumes), individual architectural features, and the various finishes and materials that make up the walls, floors, and ceilings.

General Treatment Recommendations

- Do no harm to historic materials. The minimal level of intervention necessary is recommended.
- Distinctive materials, features, finishes, and construction techniques will be preserved.
- Existing materials and features should be repaired in place where possible.
- All new repair materials should match the existing material in color, texture, composition.
- Historic windows will be repaired in a manner that preserves the historic character of the building.
- Where replacement material is necessary, use material matching to the greatest extent possible. Alternative materials should be used if matching materials are not possible, and these materials should be compatible in color, texture, and other qualities.
- Ensure that replacement material is not harder than the surrounding material and that it does no expand and contract at a difference rate.

Rehabilitation

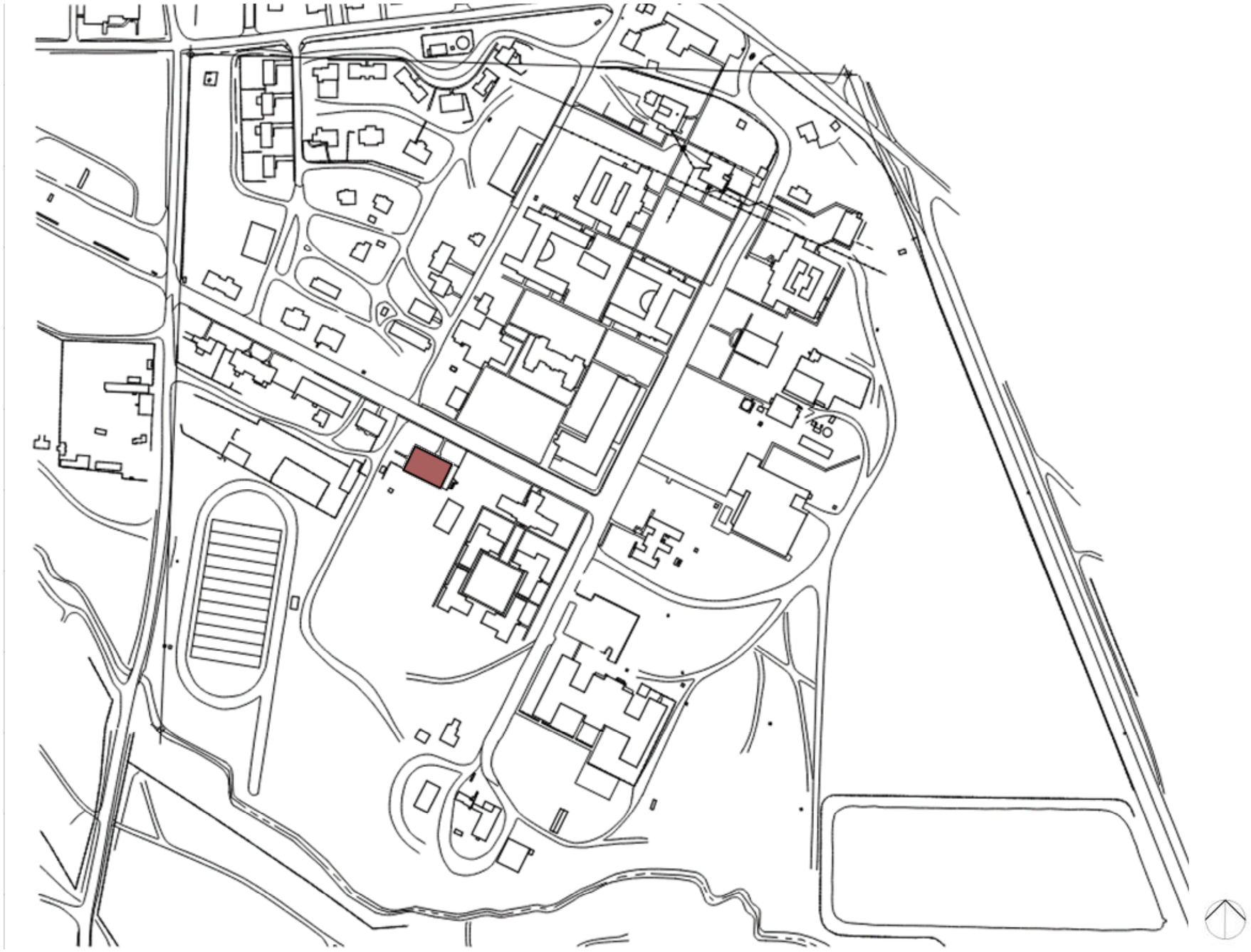
Rehabilitation as a treatment "is defined as the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values."

If an addition is required to avoid modifications to character-defining interior spaces, it should be designed to be compatible with the historic character of the building and meet the Standards for Rehabilitation, specifically 9 and 10:

> (9) New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
>
> (10) New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

National Park Service *Preservation Brief 14: New Exterior Additions to Historic Buildings* provides the following guidance:

> A new addition should be simple and unobtrusive in design and should be distinguished from the historic building—a recessed connector can help to differentiate the new from the old.
>
> A new addition should not be highly visible from the public right of way; a rear or other secondary elevation is usually the best location for a new addition.
>
> The construction materials and the color of the new addition should be harmonious with the historic building materials.
>
> The new addition should be smaller than the historic building—it should be subordinate in both size and design to the historic building.



Campus Map

Existing Site Overview

Vehicular Circulation

The Stewart Old Gym is accessed by Gibson Avenue from the north. On-street parallel and angled parking is provided along Gibson Avenue.

An unpaved access road (extension of Wa-Pai-Shone Ave) runs along the west side of the building providing service access to the south end of the Stewart Complex.

Pedestrian Circulation

Concrete sidewalks line Gibson Avenue for the entire frontage of the existing building. An existing concrete walkway connects the sidewalk on Gibson Avenue to the entry point of the building. There is additionally an existing concrete walkway and stairs to the west of the building. All site concrete is in poor condition.

Parking

There is existing parking on the north side of Gibson Avenue in the form of angled parking. There is an existing dirt parking area to the east of the existing building that is also used for parking. The site does not have accessible parking stalls near the gym or and access route to the building.

Drainage

The existing topography of the project site is flat with natural slopes draining southeast of the building. The building does not have any known drainage issues that need to be addressed. Existing flow patterns direct drainage to Clear Creek south of the Stewart Campus.

Landscaping

There is no formal landscaping at the building. The ground surface is dirt with no evidence of prior development. Several trees are located west of the building along with a single tree on the north side that are anticipated to remain.

Existing Utilities

Utility information has been collected from a number of different sources and are described below and on the attached site plan. There is very limited information on utility sizes. Utility locations and sizes will need to be confirmed in future design phases.

Natural Gas and Electrical utilities are owned by the State of Nevada and not by the utility companies. The new domestic water system and sanitary sewer systems are owned and maintained by Carson City.

Water

Carson City Utility Maps indicate that existing water mains on two sides parallel the gym. There is a 12-inch PVC main running south of the Gym, and an 8-inch PVC main directly west of the building. Survey documents did not identify evidence of any service connections to the building.

Sanitary Sewer

There is no existing sewer connection to the Stewart Old Gym, however there is existing sewer infrastructure that runs within Gibson Avenue north of the building. Utility mapping indicates this as a 10-inch main of unknown material.

Natural Gas

An existing gas line is located within Gibson Avenue north of the building. There is no current connection to the site from that line.

Storm Drainage

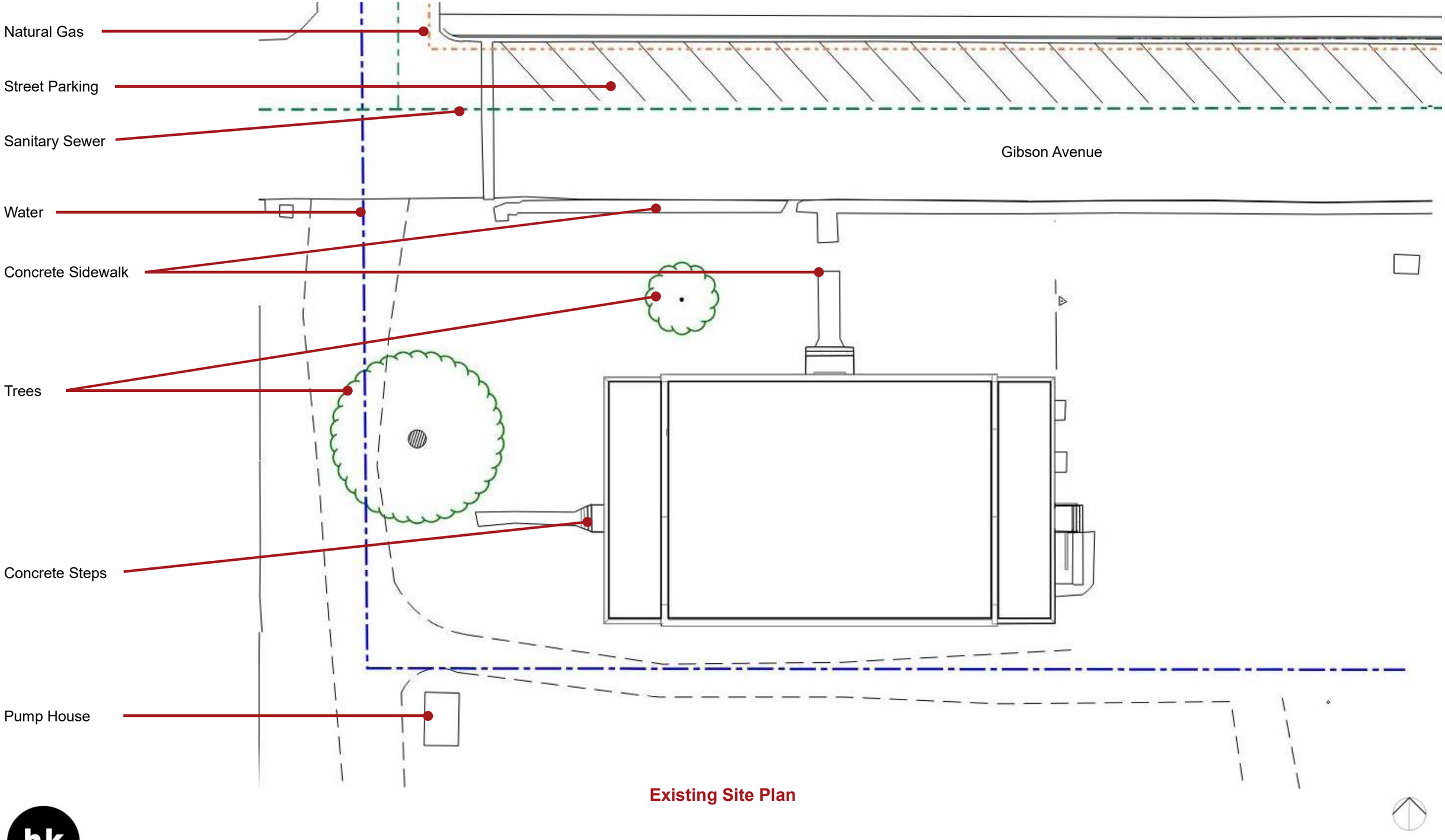
There is no existing storm drain system near the project site, however Clear Creek runs south of the Stewart campus. Gibson Avenue facilitates drainage by directing flow via curb and gutter, which eventually discharges to Clear Creek.

Electrical

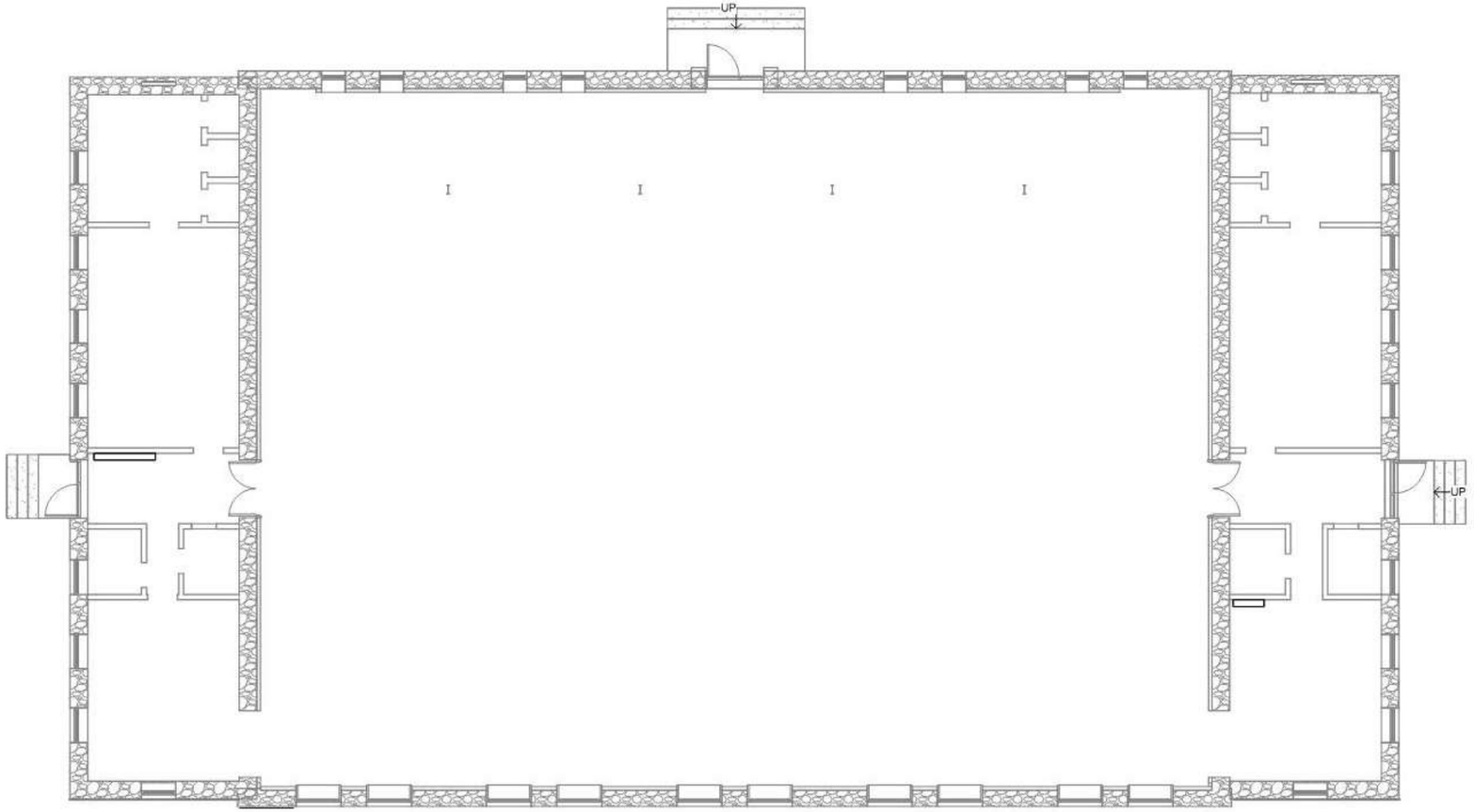
The Stewart Indian campus has a medium voltage distribution system (12.5KV). Medium voltage switch is located northeast of the building.

Lighting

The site does not have any exterior lighting, however there are a few street lamps located across Gibson to the north of the site.



Existing Site Plan



Existing Floor Plan

Existing Architecture

Exterior Walls

The exterior existing stone walls will remain. Structural reinforcement will be completed on the interior of the walls. The appearance of the stone walls from the exterior will be unchanged. Masonry repointing will be evaluated during the design phases.

Roof

The roofing was replaced in the 2019 seismic retrofit project. It is in very good condition. The high roof is a combination of asphalt shingles at the sloped section and membrane roofing at the low slope section at the north and south edges. The east and west wings have a low slope membrane roof. The insulation is located above the deck under the roofing in both locations.

Exterior Doors

The existing exterior doors are aluminum doors and are not historic. Historic photos indicate what appear to be wood doors with glass transoms. This would be in keeping with other buildings at Stewart constructed in the same time period.

Exterior Windows and Glazing

The exterior windows are steel multi-light windows with central operable pivots. The windows are eight-light-over-eight-light sash or six-light-over-six-light sash. The extant glazing is wire glass. The windows are painted on both the interior and exterior, although the paint is in poor condition. The putty is in poor condition.

Interior Walls

The interior walls are plaster over wood framing. The plaster is generally in poor condition due to water damage.

There is a brick wainscot at the gym that is in good condition. The brick has been painted- and appears to have been painted in historic photos.

The restroom and shower area has a tile wainscot that is in fair condition.

The high gable ends of the gymnasium are exposed stone

Interior Trim

There is some wood trim at the restroom areas around the doors and windows that is in poor condition. There are additional locations of wood trim on the walls that included hooks for storage. It is anticipated that the wood will need to be removed along with the damaged plaster.

Interior Doors

Many of the interior doors have been removed. The doors that remain are in poor condition or are not original.

Interior Windows and Glazing

The original windows at the ticket offices have been removed.

Floors

The gymnasium flooring was destroyed and has been removed. The resilient flooring at the office areas was removed with the previous abatement project.

There is existing tile flooring in the restroom areas that is in good condition.

Ceilings

The ceilings were removed as part of the seismic retrofit.

Stairs

The stairs to the balcony were damaged beyond repair and removed. The interior stairs to the basement are concrete.

The exterior stairs to the basement are intact but are currently covered with a concrete slab.

Balcony and Railing

The original balcony has been removed with only the steel support framing on the north wall remaining. However the original railing was removed prior to demolition and preserved for reinstallation

Existing Structural Systems

Seismic Upgrade

A construction project to repair and upgrade the seismic strength of the roof structure was performed in 2019. That project only addressed the roof so the remainder of the building still requires additional strengthening to be safe for re-occupancy.

Foundations

The existing foundation system consists of continuous concrete footings under bearing walls and isolated spread footings at columns. The existing foundation system appears to be stable so strengthening of the existing footings is not required.

Structural Wall Systems

The existing structural walls of this building are of unreinforced masonry (URM) wall construction. This is a common type of construction found in many historic buildings. However, this type of wall is highly susceptible to failure if an earthquake were to occur so they are unreliable to act as bearing walls or shearwalls. Strengthening of these walls is required.

Floor Systems

The floors of the gymnasium and the basement are of reinforced concrete slab-on-grade construction. Both of these appear to be structurally sound and sufficient for the loads associated with the proposed re-occupancy. However, the surface of the gym floor is unfit to be used as the exposed finish.

The floor systems at the main level of the east and west wings consist of elevated cast-in-place reinforced concrete slabs. The west wing slab appears to be sound and capable of supporting the loads proposed for the re-occupancy of the building. The east wing slab has experienced deterioration so strengthening is required.

Balcony

The original balconies at the east and west ends of the gym were of wood construction. The balcony at the north side of the gym was of wood and steel construction. The wood portions of these balconies were deteriorating and were removed as part of the 2019 project. The steel framing is in good condition but portions are anticipated to need to be removed to accommodate the updated balcony construction.

Roof Systems

At the gymnasium, the existing roof structure consists of the original steel trusses and purlins, as strengthened in 2019, supporting the new metal deck also added at that time. The steel trusses are supported by original steel columns.

At the east and west wings of the building, the original roof was of wood-framed construction. This roof was deteriorating and was removed during the 2019 project. The roof in these areas was then replaced using metal deck supported from the existing masonry walls and new steel beams and columns.

Existing Mechanical Systems

HVAC

The original radiator system piping and boiler have been removed. There are existing radiators in the gymnasium and support spaces that will be removed as they will not be included in the new mechanical system.

Plumbing

The existing plumbing fixtures will be removed. The water piping and sewer piping will be removed. New piping and waste connections will be provided with the new construction.

The roof drain piping was replaced as part of the roofing project. The piping will remain and be concealed in the new construction.

Existing Electrical Systems

There are no existing operable electrical systems. Existing infrastructure to be removed with new construction.

Proposed Site Development

Vehicular Circulation

It is anticipated that site access via vehicular circulation will remain the same. Preliminary investigations imply that a traffic and impact study will not be necessary for this project. Although the Stewart Old Gym will see more use after its rehabilitation, the amount of daily trips is not anticipated to impact the Stewart Campus area.

Pedestrian Circulation

The Stewart Old Gym will see more pedestrian traffic after its rehabilitation. The existing sidewalks and walkways are degraded and in need of replacement. ADA-compliant access is proposed to be installed on the west entrance of the building. An accessible concrete walkway will connect the west entrance to the sidewalk adjacent to Gibson Avenue.

Parking

The dirt parking area east of the gym is planned to be graded and surfaced to provide additional parking. Currently vehicles drive up the existing curb and gutter to access this area. The existing concrete sidewalk will be replaced and a driveway ramp will be installed to improve access to the parking area.

Drainage

Entryway drainage will gently slope away from the Stewart Old Gym to direct flow patterns away from the building. Drainage will follow existing flow patterns and discharge off the site to Clear Creek.

Landscaping

No landscape changes are anticipated to occur with construction activities, and all existing trees and vegetation will remain in place.

Proposed Utilities

Water

Water will connect to the Stewart Old Gym by tapping into one of the existing mains paralleling the building. This will be achieved by hot-tapping into the line, which will require the assistance of Carson City Public Works personnel. Additionally, an 8” fire line is planned for install to service the proposed building. Both the domestic and fire lines will require backflow prevention.

Sanitary Sewer

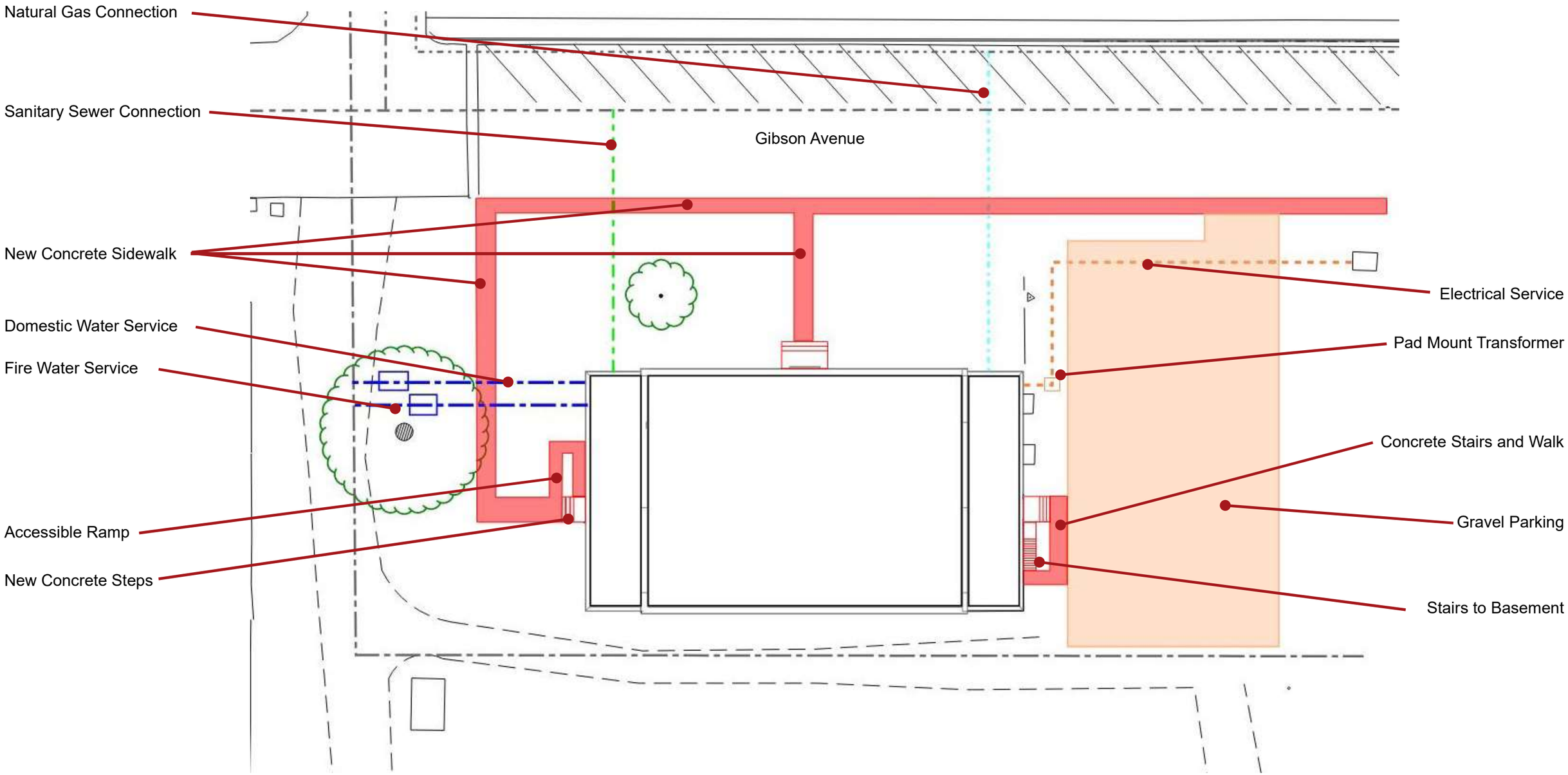
It is proposed to connect the Stewart Old Gym to the existing sewer infrastructure that runs north of the building. There is discrepancy with the size and material of the existing sewer, so it is anticipated that the contractor will be required to verify the size and material of the sewer prior to connection.

Natural Gas

Natural gas is required if the mechanical system includes boilers for heating. If that option is selected, the natural gas would be provided from the existing service in the street north of the building.

Storm Drainage

Drainage will be directed away from the building via surface flow. No piped drainage utilities are proposed.



Proposed Site Plan

Proposed Architecture

Exterior Walls

Masonry repointing will be considered during the design phase, but only in areas where the historic mortar has been compromised. Cleaning of the existing exterior masonry is not anticipated.

Roof

The existing shingle and membrane roof is to remain. Portions of roofing required to be removed to accommodate new construction will be replaced to match.

Exterior Doors

Historic photos indicate what appear to be wood doors with glass transoms. This would be in keeping with other buildings at Stewart constructed in the same time period.

Based on that, the exterior doors will be solid wood with multi-lite transoms to match the original construction. The north door will be a double door filling the entire opening. The east and west doors will be a single door wide enough to meet accessibility requirements with solid wood on either side to fill in the opening.

Exterior Windows and Glazing

The historic steel windows will remain. There will be a significant amount of work required on the windows. The glazing that is missing or broken will be replaced with single pane glazing that matches the historic glazing. All glazing that is sound will remain and will be cleaned. It is anticipated most of the glazing putty will be replaced (and may contain asbestos).

The windows will be painted on all exterior and interior surfaces. It appears the exterior portions of the windows and trim were painted black. This black exterior paint is consistent with the historic windows on the recently rehabilitated Welcome Center.

The large metal screen on the south wall of the gymnasium will remain with the rehabilitation work including making them operational, repairing damage, and repainting.

Interior Walls

Gymnasium –
The interior walls are plaster over wood studs and will be repaired as required. The existing brick wainscot will have the existing paint removed and be re-painted. In the areas where the plaster was never present (behind bleachers) the wall infill will be differentiated from the plaster with a material coordinated with the steering committee and Historic Preservation Office. New plaster will be placed over areas previously concealed by bleachers or in areas where the plaster is removed to accommodate the new steel seismic supports. It is anticipated all interior plaster surfaces will be repainted.

Support areas
The existing plaster walls will be removed to accommodate the seismic reinforcing. The new walls will be painted gypsum board over stud framing in a color palette that is similar to the original. Ceramic tile that is period appropriate will be added in restrooms.

Interior Doors

As no original interior doors are extant, the doors will all be new. Interior doors will be period appropriate solid core wood doors with 1 or 5 panels that will be painted.

All hardware will be new and will meet current accessibility requirements.

Flooring

Flooring at the Gymnasium will be wood parquet similar to the original installation that was destroyed by water damage. Flooring in the restrooms is anticipated to be mosaic tile period appropriate similar to what is existing. The community room will have resilient flooring while the support spaces will remain exposed concrete.

Ceilings

The gymnasium will receive acoustic material at the underside of the metal deck. The area under the new mezzanine will be a combination of gypsum board and wood planks. The community room will have a suspended acoustical ceiling, and the restrooms and support spaces will receive painted gypsum board ceilings.

Stairs

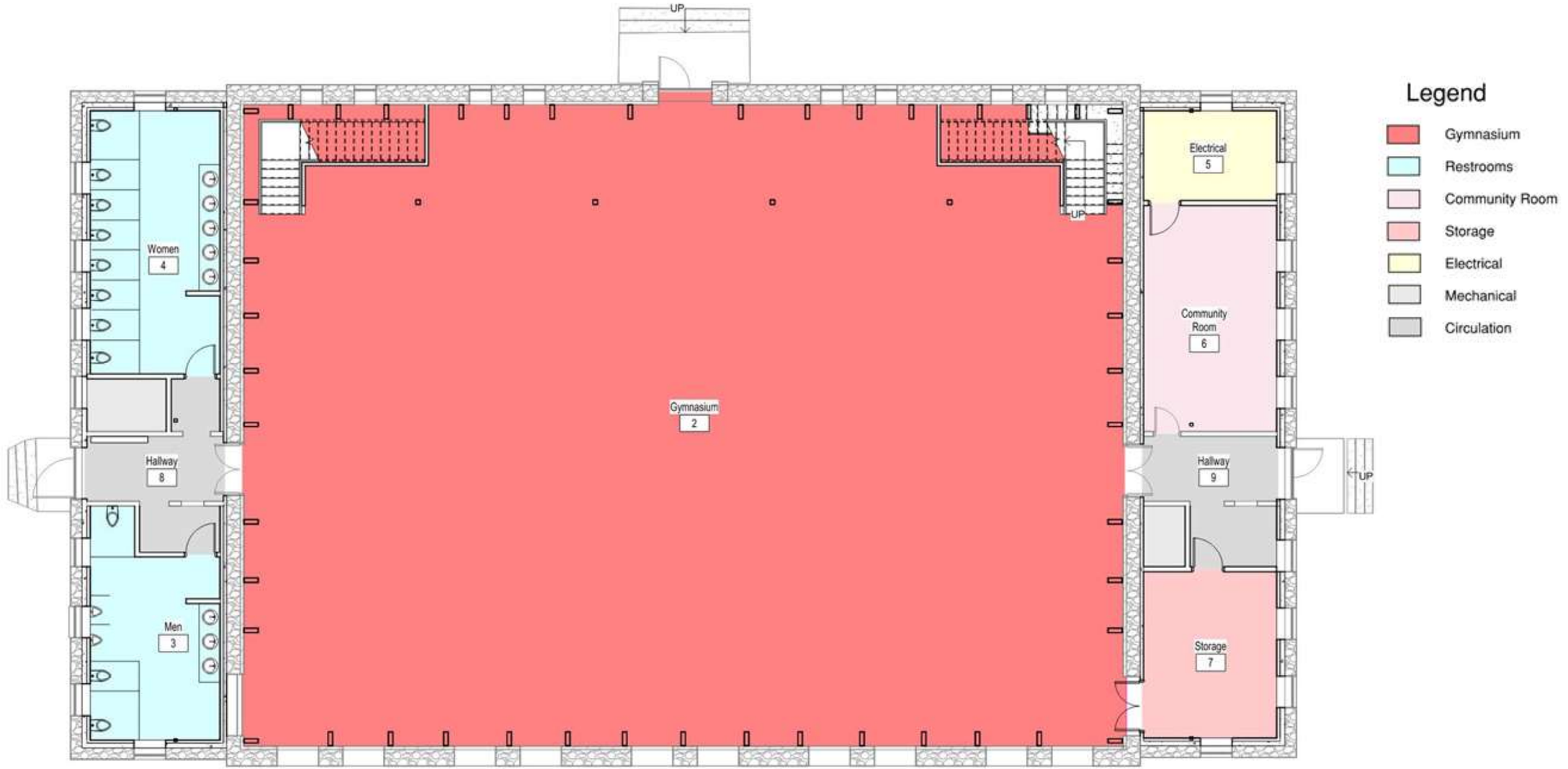
The interior stairs to the basement will be removed as part of the seismic upgrade. The exterior concrete stairs to the basement will be uncovered and updated for use as access to the basement.

The stairs to the new mezzanine will be steel framed stringers with concrete filled pan treads. Due to code constraints, and interest in allowing the public to access the mezzanine, the stairs will be partially reconfigured located in the same location at the first level with the upper run reconfigured from the historic. Steel and concrete are recommended to differentiate original from the new.

Balcony Replacement

Due to code constraints it is not possible to reconstruct the balcony as it was originally configured. Instead, a flat floor mezzanine will be provided matching the original dimensions of the balcony. The pipe railing that was preserved prior to the removal of the balcony will be reinstalled at the edge of the mezzanine - with a clear panel attached to the mezzanine side to meet current code requirements.

New retractable bleacher seating will be placed on the mezzanine to accommodate the original feel of the interior space.



Proposed Floor Plan

Gymnasium Looking Northwest

Proposed Building Systems

Due to the age and condition of the existing building systems, the project will replace the mechanical and electrical systems with new, contemporary equipment. The insertion of these new systems is anticipated to be done in concealed spaces to a great extent. There will be new components that will be installed in a manner that does not detract from the historic fabric of the building.

The structural portion of the project is to upgrade and strengthen the framing systems to the levels required by the International Existing Building Code and allow for safe occupancy of the building.

Proposed Structural Systems

Foundations

New reinforced concrete foundations will be required to support elements of the new structural framing. Continuous footing will be needed under new shotcrete walls, braced frames, and strong-backs along the walls. Spread footings will be required under new columns supporting the balcony.

Structural Wall Systems

The existing unreinforced masonry walls should be braced against failure due to out-of-plane seismic loads. It is proposed to accomplish this by the addition of new vertical steel strong-backs at the tall gym walls and the addition of reinforced shotcrete on the low walls occurring at the east and west wings.

Floor Systems

The existing concrete floor slab of the gym is proposed to be removed in its entirety. This will allow for placement of the new footings and installation of new reinforced concrete slab which will provide a smooth, level substrate for the new gym floor.

The elevated cast-in-place slab at the east wing, which has visible rebar deterioration, is proposed to be strengthened using a fiber-reinforced polymer (FRP) system installed on the bottom side of the slab.

Balcony

The new balcony is proposed to be built using steel beams and columns supporting concrete slab-on-metal-deck. Where possible, the steel framing will be supported from the new wall strong-backs.

Roof Systems

The roof was strengthened during a previous project so additional structural measures are not required. However, portions of the metal roof deck will need to be removed and then replaced to allow other framing members to be placed in the building.

Lateral Force Resisting System

The vertical elements of the current lateral force resistance system are the unreinforced masonry walls acting as shearwalls. These are not sufficient so new diagonal steel braces and reinforced shotcrete should be added to provide the required strength.

Proposed Mechanical Systems

HVAC

Indoor Conditioning:

The ancillary spaces (toilet rooms, Community Room, storage, etc.) will be conditioned by concealed ducted fan-coils and air distribution. Ventilation will be provided via OSA hoods located on the low roof areas. The hoods and ductwork will be designed to be contained below the parapet walls.

The basement mechanical spaces will be provided heating via unit heaters.

The main floor gym area will be conditioned with 2 air-handlers located in the truss space, above the Mezzanine floor. A maintenance platform will be provided at each air-handler with ladder access from the Mezzanine floor. Exposed ductwork will run in the truss space with outlets directed toward the main floor. Destratification fans will be installed in the open space above the main floor. Outside air will be provided for ventilation and economizer cooling from roof mounted intake hoods. Exhaust air will similarly discharge through roof mounted exhaust hoods. The four hoods are anticipated to be located on the south side of the roof.

Central Plant: Four scenarios are being provided for discussion and selection.

1. All indoor air-handlers and fancoils will be provided chilled water via a water to water heatpump chiller located in the basement Mechanical space. The heatpump will be coupled to a geothermal well field located in the old football field to the South of the building. Geothermal pumps will be located in the basement Mechanical space. A heating water heatpump, coupled to the geothermal system, will provide 130ºF water to the heating coils.
   a. Pros of this system include limited above ground outdoor equipment. All equipment will be in the basement mechanical room.
   b. Cons include the cost of the well field which could be extravagant depending on the soils condition: Heat pump refrigerant located in the basement and the required refrigerant machinery room exhaust which would need to be ducted through the low roof or potentially through the high roof.
2. All indoor air-handlers and fancoils will be provided chilled water from a ground mounted air-cooled chiller located to the south of the building. Heating water will be provided by a gas fired high efficiency boiler located in the mechanical space in the basement. All pumps and mechanical accessories will be located in the basement mechanical space.
   a. Pros include a relatively low first cost, ease of maintenance and reliability.
   b. Cons include the above ground air-cooled chiller from both a physical presence, noise and relatively high Kw/Ton operating range.
3. All indoor air-handlers and fancoils will be provided chilled water from a water cooled modular chiller located in the basement mechanical room coupled to a conventional ground mounted cooling tower located to the south of the building. Heating water will be provided by a gas fired high efficiency boiler located in the mechanical space in the basement. All pumps and mechanical accessories will be located in the basement mechanical space.
   a. Pros include a relatively low first cost, ease of maintenance and reliability.
   b. Cons include the above ground cooling tower from both a physical presence and noise: Maintenance of the cooling tower and water conditioning: Chiller refrigerant located in the basement and the required refrigerant machinery room exhaust which would need to be ducted through the low roof or potentially through the high roof.
4. All indoor air-handlers and fancoils will be coupled to variable refrigerant flow outdoor heatpumps and provided heating and cooling via refrigerant. We anticipate two separate VRF systems serving the West and East air-handling equipment. The gym air-handlers would be equipped with air-handler modules and DX coils while the fan-coils could be a combination of cassette and high wall units.
   a. Pros include good temperature regulation via refrigerant: smaller pipe sizes for distribution of refrigerant piping vs chilled and heating water pipes: smaller above ground outdoor equipment.
   b. Cons include two locations for above ground equipment from both a physical presence and noise: Refrigerant piping located within the space and the potential for refrigerant mitigation via exhaust to the outdoors.

The scenarios for the Central Plant were reviewed with the State Public Works Division and it was determined that options 3 and 4 were the most viable for the project and would be carried forward into the next phase of design for additional consideration.

Plumbing

Plumbing fixtures will be provided in the restroom areas and the food prep area as necessary. New water and waste piping will be provided throughout as necessary. A sump pump will be added to the basement to provide for dewatering, and for necessary drainage for the new boiler system and a drain at the exterior entrance stair.

Fire Sprinkler

Fire sprinklers will be added to the building to provide coverage in all areas as required. A new fire riser and a new water supply for the sprinkler system will be provided.

Proposed Electrical Systems

Electrical Distribution

Primary Electrical Service / Distribution

The Stewart Indian campus has a medium voltage distribution system (12.5KV). Medium voltage switch is located northeast of the building and will supply power. The medium voltage switch will be used to supply the primary side of a new 75KVA 12.5K-208/120V 3 phase, 4 wire transformer to be set 10 feet minimum away from the building. A 225A 3 phase, 4 wire 208/120V panel will be located in the electrical room for branch circuit loads.

Equipment Sizing Criteria – Branch Circuit Load Calculations

Lighting	Connected load.
Receptacles	80 VA per 120V general convenience outlet (single and duplex). Quad receptacles shall be considered as two 180 VA loads, minimum.
Special outlets	Actual installed wattage of equipment served.
Surface raceway/bench tops	180 VA per single or duplex convenience receptacle, minimum.
Dedicated equipment circuits	Actual load or 1,200 VA per 120V outlet; 4,160 VA for each 208V/30A/1Ø outlet, minimum
Motors	100% of motor full load amps

Demand Factors

Lighting	125% of total wattage
Receptacles	100% of first 10 kVA plus 50% of remainder over 10KVA.
Motors	125% of wattage of largest motor plus 100% of wattage of all other motors
Fixed equipment	100% of total wattage

Feeder Sizes

Branch circuit panels shall be sized for a minimum of 20% future capacity. Feeders from distribution panels to branch circuit panels to be sized the same as the secondary panel bus size.

Grounding System

The grounding system will be modified in compliance with NEC 250. All feeders and branch circuits will contain insulated, copper, equipment ground conductors. Each conduit will have an equipment grounding conductor sized in accordance with the load and/ or breaker.

Branch Circuits

Individual circuits will be used for lighting and receptacle loads (mechanical loads will be segregated as well if required). Generally, the loading on lighting and receptacle circuits will be limited to 80% or less of the branch breaker rating. The minimum wire size for branch circuits is No.12 AWG copper, except that No. 10 AWG copper will be used on 120-volt circuits longer than 88 feet. An equipment-grounding conductor will be run in each branch circuit.

Lighting Systems

The lighting will be designed to meet the requirements of 2024 IECC and ASHRAE/IESNA Standard 90.1.

Lighting fixtures will be energy efficient LED fixtures to minimize lighting power densities (LPD) in order to meet Code requirements for energy usage.

All interior lighting will be solid state (LED) with a CCT of 4000K. Interior lighting will be designed to meet requirements for Controllability and Minimum Energy Performance of IECC 2024.

Interior Lighting Controls:

Daylighting controls will be utilized as required by code in areas where skylights and windows contribute effective daylight to the space(s). In those spaces with sufficient side or top daylight, generally 150% of the electric lighting, automatic dimming of fixture rows in effective daylit spaces will be incorporated.

0-10VDC fixtures will be specified where possible to take advantage of dimming features that are typically standard with LED fixtures.

UL listed 924 devices will be used to bypass control inputs upon loss of normal power and transfer to central emergency inverter power.

IESNA recommended footcandle levels will be used as the baseline design standard along with the general lighting criteria for the various spaces as follows:

Restrooms: Light fixtures will be recessed linear and can fixtures. Ceiling mounted occupancy sensors will provide automatic shut off per code.

Design Footcandle Levels: 25 FC horizontal maintained.

Gymnasium: Chain hung LED high bay fixtures will be used for general illumination. Control in these areas will be via local occupancy sensors with manual wall dimmers. Depending on the

amount of daylight incorporated in the spaces adjacent the exterior windows, the fixtures within effective daylit zones may be dimmed or switched in response to input from a photocell.

Design Footcandle Levels: 55 FC horizontal maintained.

Community Room: Recessed direct/indirect volumetric type fixtures will be used for general illumination. Control in these areas will generally be via local occupancy sensors with manual wall dimmers.

Design Footcandle Levels: 45 FC horizontal average maintained.

Storage/Corridors: Recessed direct volumetric type fixtures will be used for general illumination. Control in these areas will generally be via local occupancy sensors and manual wall switches.

Design Footcandle Levels: 40 FC horizontal average maintained.

Mechanical: Industrial fixtures will be used. Switching will be via local occupancy sensor control with manual wall switch.

Design Footcandle Levels: 40 FC horizontal average maintained.

Exterior: Wall mounted wall packs of the entrances and exits will be used. Switching will be via local occupancy sensor control and photocell.

Design Footcandle Levels: 15 FC horizontal average maintained.

Emergency Egress Lighting:

Egress illumination, exit signs and electrical room lighting housing an EPSS shall be provided with battery back-up or central inverter. All code required egress lighting shall be provided a central emergency lighting inverter or integral battery backup. Lighting levels for egress will be 1 FC average with a maximum illuminance ratio of 40:1.

Lighting Control System:

All lighting control to be controlled via local device.

Power:

Low voltage power distribution will be achieved with a branch panel located in the electric room. 3-phase, 120/208V panelboard.

Dedicated power connections will be provided for all specialty machines located in the designated space.

The following are typical anticipated receptacles that would be installed in various spaces. Final design will be coordinated with the user's requirements for the space.

Restrooms: Provide GFCI protected duplex receptacle above sink counter tops.

Gymnasium/Mezzanine: Provide duplex receptacle every 12' on center around the room.

Community Room: (3) Duplex receptacles on each wall without door; (2) receptacle on wall with door. Any additional power requirements for specialty equipment.

Storage/Corridors: Provide duplex receptacle every 12' on center around the room.

Mechanical: Provide service receptacle where required.

Emergency power

Not anticipated to be required or provided.

Special Systems

Fire Alarm System

Remodeled areas will have existing devices removed to accommodate the revised enclosed spaced. New fire alarm control panel (FACP) to be located in the electrical room. Devices will be included to provide coverage per applicable codes. All new devices will be Class B, supervised, 24-volt DC-powered and connected to the existing addressable fire alarm system. All fire alarm wiring shall be in conduit.

Additional devices that may be required in the area of remodel include area smoke detection, duct smoke detectors, smoke detectors, heat detectors and audio/visual (Horn/Strobe) notification appliances will be located throughout the building based on Code requirements.

The fire alarm system will have a 60 hour standby and 15-minute alarm capability per NFPA 72.

Telecommunications

Premise Telecommunications Infrastructure:

Data, voice, and audio/visual services will be distributed throughout the building via an infrastructure consisting of telecommunications rooms and a structured cabling system. The centralized telecom rack will be the central distribution point for backbone telecommunications cabling throughout the building.

18" to 24" wide wire basket tray will be installed to route horizontal data, voice, and AV cabling from the telecom rack. Telecommunication outlets for computers, printers, wireless access points, building directory displays and audio-visual (AV) equipment will be provided at all areas. A structured Category 6A cabling system will be installed from each telecom room to the work area outlets. The telecommunication rooms will house rack mounted cable terminations and active electronic equipment to support the data, voice, and AV systems. J-hooks will be installed at 5'-0" OC from this point to the wire basket tray.

Work Area Cabling and Termination:

Type and Number of Communications Outlets: Typical telecommunication outlets will consist of four-port faceplates with plastic label holders. A minimum of two (2) Category 6A data drops will be provided at each outlet. The number of telecommunication outlets will be dependent on the use of the space.

Telecom outlets located above ceilings will be spaced throughout the building to support an infrastructure of Wireless Access Points. A 25'-0" cable loop will be provided at each access point to allow the Wireless Access Point to be relocated anywhere in a 25'-0" radius. Power will be provided to the Wireless Access Points via POE switches or injectors located at the Telecom rack.

Telecom outlets will be mounted in the ceiling of each space to support projectors, monitors, and AV equipment.

Work Area Jacks: 8-pin Category 6A jacks will be provided at work area outlets for data (color blue).

Horizontal Cabling: Horizontal voice and data cabling from the telecom rack to the telecommunications outlets shall be Category 6A. All horizontal cabling will have a plenum rated (CMP) jacket (color blue).

Data / Voice Patch Panels: Horizontal data cabling shall be terminated on 19" rack mounted 48-port Category 6A patch panels. Data ports will be cross connected to Owner furnished switches with Category 6A patch cords.

Cabling Manufacturer and Warranty: All Telecommunications cabling shall be manufactured by Belden or CommScope Systimax. The Telecommunications system shall carry a 25-Year warranty.

Telecommunications Grounding System:

General: The entire telecommunication system shall be bonded and grounded in accordance with ANSI/TIA-607-C. A telecommunications ground bar will be installed at each telecom rack. The following equipment will be bonded to ground with a #6 AWG grounding conductor:

- Equipment racks and cabinets.
- Ladder rack.
- Backbone conduit.
- Building entrance terminals.
- Outside plant copper cable shields.

Ground Bars: UL listed copper grounding bars with insulated standoffs and stainless-steel mounting brackets will be provided in all telecom rooms. The size of the ground bars will be minimum 20" x 4" x ¼". Ground bars shall have pre-drilled lug mounting holes to accommodate attachment of two-hole lugs. Ground bars shall be bonded to ground as follows:

Ground bars shall be grounded to building steel in each telecom room with a minimum #2 solid green insulated grounding conductor. Will communicate with a master station located next to the fire alarm control panel (FACP) located in the fire command center.

Gymnasium Looking North

Gymnasium Looking Southwest